

Revised

ISO

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION

ISO RECOMMENDATION R 144

REVERSE BEND TESTING OF STEEL WIRE

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BRIEF HISTORY

The ISO Recommendation R 144, *Reverse Bend Testing of Steel Wire*, was drawn up by Technical Committee ISO/TC 17, *Steel*, the Secretariat of which is held by the British Standards Institution (B.S.I.).

During its third meeting, held in London, in December 1953, the Technical Committee decided to undertake the study of an ISO Recommendation concerning this test and assigned the task of preparing a draft proposal on this subject to its Working Group ISO/TC 17/WG 1, *Methods of Mechanical Testing for Steel*.

A first draft proposal drawn up by Working Group No. 1 was submitted to the Technical Committee during the plenary meeting held in London, in March 1957. As a result of decisions reached at that meeting, a second draft proposal was prepared by the Secretariat and was submitted to the members of the Technical Committee for approval. With some minor amendments, this draft proposal was accepted and a revised version, incorporating these amendments, was adopted as a Draft ISO Recommendation.

On 11 July 1958, this Draft ISO Recommendation (No. 205) was distributed to all the ISO Member Bodies and was approved, subject to some amendments, by the following Member Bodies:

Australia	Germany	Poland
Austria	Hungary	Romania
Bulgaria	India	Spain
Burma	Israel	Sweden
Chile	Italy	Switzerland
Czechoslovakia	Japan	United Kingdom
Denmark	Netherlands	U.S.S.R.
Finland	New Zealand	Yugoslavia
France	Norway	

One Member Body opposed the approval of the Draft: Belgium.

The Draft ISO Recommendation was then submitted by correspondence to the ISO Council, which decided, in February 1960, to accept it as an ISO RECOMMENDATION.

REVERSE BEND TESTING OF STEEL WIRE

1. SCOPE

This ISO Recommendation applies only to wire having a diameter equal to or greater than 0.5 mm (0.02 in).

2. PRINCIPLE OF TEST

- 2.1 The test consists of repeated bending through 90°, in opposite directions, of a test piece held at one end, each bend being over a cylindrical surface having a specified radius.
- 2.2 One reverse bend consists of bending the test piece through an angle of 90° and then returning it to its original position (see Fig. 1).

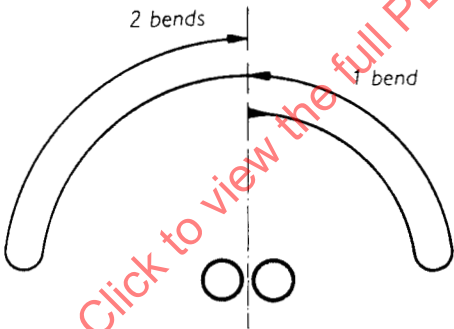


FIG. 1. — Method of counting reverse bends

3. SYMBOLS AND DESIGNATIONS

Number	Symbol	Designation
1	<i>d</i>	Diameter of a round wire (see Fig. 2, page 5)
2	<i>a</i>	Minimum thickness of a wire of non-circular section which it is possible to arrange between parallel clamps (see Fig. 3, page 5)
3	<i>R</i>	Radius of curvature of blocks
4	<i>h</i>	Distance from top of blocks to bottom face of guide 
—	<i>N_b</i>	Number of reverse bends

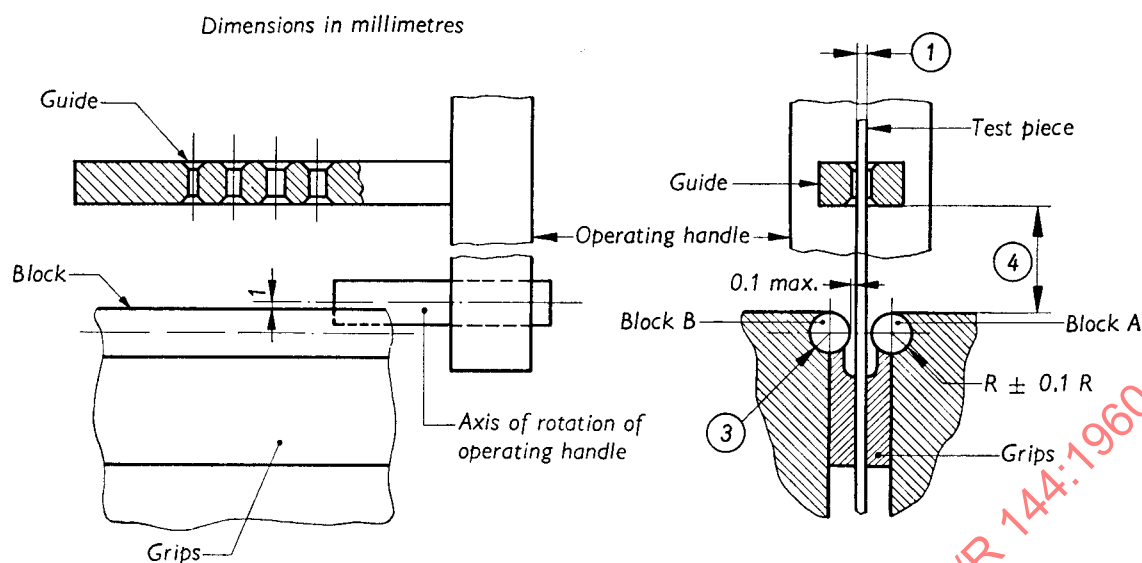


FIG. 2. — Bend testing machine for wire

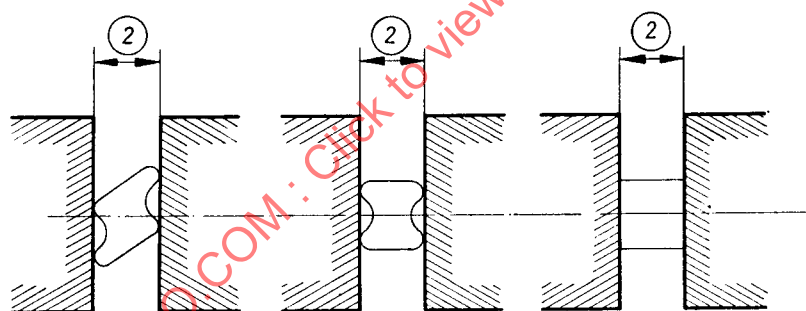


FIG. 3. — Examples of position of non-circular test pieces

4. TEST PIECE

- 4.1 The test piece consisting of a piece of wire should preferably be straight before testing, but it may be curved in the plane in which the test bends are to be made.
- 4.2 If straightening is necessary, it should be done by hand, but if this is not possible, a wooden, plastic or copper hammer may be used.

5. PROCEDURE

- 5.1** A common method of carrying out the test includes the following operations:
- 5.1.1** Hold one end of the test piece between two blocks *A* and *B*, each of which is rounded to the specified radius, as shown in Figure 2, page 5.
 - 5.1.2** Bend the protruding portion of the test piece through 90° over block *A* and then bring it back to its original position.
 - 5.1.3** Then bend the test piece in the same plane in the reverse direction over block *B* and again return it to its original position.
- 5.2** This procedure is repeated as often as specified or necessary to produce failure. This description of the procedure does not imply that the test piece is to be stopped entirely after each bend.
- 5.3** Bending is at a rate such that the heating does not affect the result of the test, but in any case the rate should not exceed one bend per second, unless otherwise specified.
- 5.4** To ensure contact of the test piece with the blocks, a tensile load not exceeding the equivalent of 2 per cent of the nominal tensile strength of the wire may be applied during bending.

6. TESTING MACHINE

- 6.1** The line joining the centres of the radius of curvature of each cylindrical block should be perpendicular to the direction of the axis of the test piece. The axes of the blocks should be parallel and at right angles to the surfaces of the blocks. The clearance between the test piece and each block, measured on a line joining the centres of curvature of the blocks, should not be greater than 0.1 mm.
- 6.2** The radius *R* of the blocks should be one of the following:
- | | | | | | | | |
|------|------|------|------|-----|-----|-----|----|
| 2.5, | 5.0, | 7.5, | 10, | 15 | and | 20 | mm |
| 0.1, | 0.2, | 0.3, | 0.4, | 0.6 | and | 0.8 | in |
- 6.3** The distance *h* from the top of the blocks to the bottom face of the guide should be as follows:

Thickness of wire <i>d</i> or <i>a</i>	Distance <i>h</i>
Up to 2.5 mm (0.1 in)	25 to 50 mm (1 to 2 in)
Over 2.5 mm (0.1 in)	50 to 75 mm (2 to 3 in)